How To Prevent Cerebrovascular Events (Strokes And TIAs) When Using Upper Extremity Access For Ch/EVAR And F/B/EVAR: What Factors Increase Stroke Risk

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Introduction:

Ch-EVAR

International
Multicenter
Retrospektive


Risk factors for stroke in ChEVAR

- Analysing data of PERICLES Registry
- 2008 - 2014
- 425 patients

1.9 % Stroke/TIA (8 Patients)

Stroke: Comorbidity

- Age
- Hypertension
- Diabetes
- Smoking
- Coronary disease
- Renal disease
- Stroke
- Hypoalbuminemia
- Hypoproteinemia
- Hypothyroidism
- Hypokalemia

<table>
<thead>
<tr>
<th>Condition</th>
<th>Ch-EVAR (n=889)</th>
<th>Ch-EVAR+TAD (n=975)</th>
<th>No Stroke/TIA (n=794)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>75±8 (64-96)</td>
<td>75±7 (72-96)</td>
<td>76±7 (68-96)</td>
</tr>
<tr>
<td>Hypertension</td>
<td>29±15 (0-92)</td>
<td>20±6 (0-92)</td>
<td>22±6 (0-91)</td>
</tr>
<tr>
<td>Diabetes</td>
<td>8±7 (0-96)</td>
<td>18±3 (3-46)</td>
<td>16±2 (3-38)</td>
</tr>
<tr>
<td>Smoking</td>
<td>3±1 (0-6)</td>
<td>3±1 (0-6)</td>
<td>3±1 (0-6)</td>
</tr>
<tr>
<td>Coronary disease</td>
<td>3±1 (0-92)</td>
<td>2±0 (0-62)</td>
<td>2±0 (0-62)</td>
</tr>
<tr>
<td>Renal disease</td>
<td>8±1 (0-62)</td>
<td>3±0 (0-62)</td>
<td>3±0 (0-62)</td>
</tr>
<tr>
<td>Stroke</td>
<td>4±2 (0-62)</td>
<td>1±0 (0-62)</td>
<td>1±0 (0-62)</td>
</tr>
<tr>
<td>Hypoalbuminemia</td>
<td>0±0 (0-0)</td>
<td>0±0 (0-0)</td>
<td>0±0 (0-0)</td>
</tr>
<tr>
<td>Hypoproteinemia</td>
<td>0±0 (0-0)</td>
<td>0±0 (0-0)</td>
<td>0±0 (0-0)</td>
</tr>
<tr>
<td>Hypothyroidism</td>
<td>0±0 (0-0)</td>
<td>0±0 (0-0)</td>
<td>0±0 (0-0)</td>
</tr>
<tr>
<td>Hypokalemia</td>
<td>0±0 (0-0)</td>
<td>0±0 (0-0)</td>
<td>0±0 (0-0)</td>
</tr>
</tbody>
</table>
Stroke: Anatomic + procedural factors

<table>
<thead>
<tr>
<th>Anatomic Factors</th>
<th>Procedural Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subclavian</td>
<td>30 (13%)</td>
</tr>
<tr>
<td>Carotid</td>
<td>2 (13%)</td>
</tr>
<tr>
<td>Ultrasound</td>
<td>30 (13%)</td>
</tr>
<tr>
<td>CT Scan Aorta abdominal + thoracic (Arch !)</td>
<td>30 (13%)</td>
</tr>
<tr>
<td>One sided double puncture in case of double chimney</td>
<td>30 (13%)</td>
</tr>
<tr>
<td>Avoid bilateral access</td>
<td>30 (13%)</td>
</tr>
<tr>
<td>Reduced OR-time</td>
<td>30 (13%)</td>
</tr>
</tbody>
</table>

Conclusion Ch-EVAR

What could help?
- CT Scan Aorta abdominal + thoracic (Arch !)
- One sided double puncture in case of double chimney
- Avoid bilateral access
- Reduced OR-time

Conclusion Ch-EVAR

- Stroke is associated with high in-hospital mortality
- It all starts with patient selection (access, arch, comorbidities, ...)
- 1-2 Ch-EVAR seems to be safe

Stroke in pararenal aneurysms

- What about BEVAR / FEVAR
  - Right sided access?
  - Aortic wall thrombus?
  - OR Time?

Stroke / TIA

- Stroke/ TIA in this study : 1.9 %
- f/B EVAR: ± 2.5 %
- F-EVAR: 0.3 % - 2 %

References:
- Kindsfater, Ann Surg 2015
- Katsargyris et al. JEVT 2013
- Knowles et al. JVS 2015
- Globalstar, Circulation 2012
Right sided access

- Stroke: 2/61 (3.3%)
- Major strokes
- OR Time: 460 ± 147 vs 550 ± 57 minutes in the stroke group (P = .220).


Aortic Wall Thrombus (AWT)

- FEVAR/BEVAR
- Pararenal/ Type 4 TAAA
- Stroke 4/212 (1.9%)
- No significant AWT in Arch
- Study excluded patients with severe arch debris


Conclusions

- Comparable low incidence of cerebrovascular events after Ch-EVAR / BEVAR / FEVAR
- More events in bilateral access
- No difference right vs left side access
- AWT (due to small sample size and patient selection?) not significant as RF

Thank you!

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